TINY ASSEMBLER (PET)

PAGE

```
10  REM INITIALIZE VARIABLE
100 FLX=0TH:N7230
102 POKE[illegible],48:POKE51,48:POKE43,48:MO$="3000"
105 PRINT"INITIALIZING":DEF FNA(A)=9*INT((A-48)/16)+A-INT(A/16)*16
135 P$="0393A4B5B1B691B888D0F9B1B691B860":GOSUB7100
137 P$="037AAD9003AE9103AC9203200000D90038E91038C9203600000000":GOSUB7100
140 Q$=CHR$(34)
145 DIM O$(15)
155 GOSUB2200
199 GOTO6200
900 REM CONVERT OCTAL NUMBER
910 A=0:XK=LEN(A$)
920 FORIK=XKTO1STEP-1
930 A=A+(VAL(MID$(A$,IK,1))*(8^(XK-IK)))
940 NEXTIK:RETURN
950 B=0:XA=A:FORIK=5TO0STEP-1
960 B=B+(INT(XA/(8^IK))*(10^IK))
970 XA=XA-(INT(XA/(8^IK))*(8^IK))
980 NEXTIK:RETURN
1500 REM TINY PET-ASSEMBLER
1505 PRINT"&&TINY PET-ASSEMBLER&&"
1515 INPUT"LOAD ADDR";A$:GOSUB6695:LA=A
1516 FORV=1TO20
1517 PRINT"PLACE QUOTES BEFORE EACH INPUT LINE"
1518 PRINT"PLACE QUOTES BEFORE EACH INPUT LINE"
1519 NEXTV
1520 OA=LA
1530 PRINT"LOAD  ORG    OPC OPERANDS  ASSEM OUTPUT"
1535 FORMK=1TO20
1540 T=9:GOSUB6640:PRINT"  ";
1545 T=OA:GOSUB6640
1550 INPUTS$:S$=S$+BB$
1555 IFLEFT$(S$,3)="END"THEN1599
1560 GOSUB3100
1565 IFER$<>""THENPRINT"";TAB(27);ER$:GOTO1590
1570 PRINT"";TAB(27);LEFT$(P$+BB$,12)
1575 S=LA:GOSUB7900
1580 L=LEN(P$)/2
1585 OA=OA+L:LA=LA+L
1590 NEXTMK
1599 GOTO6320
2200 REM INITIALIZE ALL VARIABLES
2205 MT$="ADCANDASLBITCMPCPXCPYDECEORINCJSRLDALDXLDY"
2206 MT$=MT$+"LSRORAROLRORSBCSTASTXSTYJMP"
2207 MT$=MT$+"BCCBCSBEQBMIBNEBPLBVCBVSBRKCLCCLDCLICLVDEXDEYINXINYNOPPHAPHPPLA"
2208 MT$=MT$+"PLPRTIRTSSECSEDSEITAXTAYTYATSXTXATXSORGEXTBYTADRTXTEND"
2210 JT$="1111188111918811111111122222222333333333333333333333333456667"
2215 OP$="61210620C1E0C0C241E220A1A2A042012262E1818280409060F030D01050700018"
2216 OP$=OP$+"D858B8CA88E8C8EA48086828406038F878AAA898BA8A9A000000010200"
2220 AM$="FEFE3D14FE16163CFE3C10FE5E3E3DFE3D3DFEFE1C1C10"
```

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```
2230 H$="0123456789ABCDEF"
2250 BB$="                    "
2255 CC$=""
2260 RETURN
2800 REM CONVERT DECIMAL TO HEX STRING
2810 J8=2:A$=""
2820 FORI8=1TOJ8:K8=J8-I8:E=16^K8
2830 A$=A$+MID$(H$,INT(A/E)+1,1)
2835 A=A-INT(A/E)*E
2840 NEXTI8:RETURN
2850 J8=4:A$="":GOTO2820
2900 REM CONVERT HEX STRINGS TO DECIMAL
2910 A$=RIGHT$("0000"+A$,4):A=0
2920 FORI8=1TO4:A=A+16^(I8-1)*FNA(ASC(MID$(A$,5-I8,1))):NEXTI8:RETURN
3000 REM PARSE ADDRESS OPERANDS
3002 X0=ABS(4*(MID$(JT$,N,1)="8"))
3005 C=1:O=8:IFMID$(L$,1,2)="A "THENOP=OPAND:GOTO3092
3010 S=2:C=2:O=ABS(8*(MID$(JT$,N,1)="1")):IFMID$(L$,1,1)="#"THEN[illegible]
3015 S=2:IFMID$(L$,1,1)<>"#"THEN3050
3020 C=4:O=4:IFMID$(L$,4,1)=" "THEN3098
3025 C=8:O=20:IFMID$(L$,4,2)=",Y"THEN3098
3030 IFMID$(L$,4,2)=",X"THEN3098
3035 C=16:O=ABS(12*(MID$(JT$,N,1)<>"9")):IFMID$(L$,6,1)=" "THEN[illegible]
3040 C=32:O=28:IFMID$(L$,6,2)=",X"THEN3094
3045 C=64:O=24+X0:IFMID$(L$,6,2)=",Y"THEN3094
3047 GOTO3090
3050 S=3:IFMID$(L$,1,2)<>"($"THEN3090
3055 C=16:O=44:IFMID$(L$,5,1)=")"ANDOP=64THEN3098
3060 C=128:O=0:IFMID$(L$,5,3)=",X)"THEN3098
3065 O=16:IFMID$(L$,5,3)=",Y)"THEN3098
3067 GOTO3090
3085 A$=MID$(AM$,N*2-1,2):GOSUB2900:ER=1
3086 IFANDC THENER=0
3087 A=OPORG:GOSUB2800:RETURN
3090 P$="":ER$="OPERAND ERR":RETURN
3092 GOSUB3085:IFERTHEN3090
3093 P$=A$:RETURN
3094 GOSUB3085:IFERTHEN3090
3095 P$=A$+MID$(L$,5+2,2)+MID$(L$,5,2):RETURN
3098 GOSUB3085:IFERTHEN3090
3099 P$=A$+MID$(L$,5,2):RETURN
3100 REM ONE PASS TINY ASSEMBLER
3105 P$="":ER$="":N=0
3130 N=N+1:IFN>62THEN3145
3135 IFMID$(S$,1,3)<>MID$(MI$,N*3-2,3)THEN3130
3137 A$=MID$(OP$,N*2-1,2):GOSUB2900:OP=A:O=0
3140 ONVAL(MID$(JT$,N,1))GOSUB3155,3160,3162,3145,3145,3165,3145,[illegible]
3142 RETURN
3145 P$="":ER$="OPCODE ERROR"
3150 RETURN
```

```
3155 L$=MID$(S$,5,8):GOTO3000
3160 A=OP:GOSUB2800:P$=A$:GOSUB2800:P$=P$+A$:RETURN
3162 A=OP:GOSUB2800:P$=A$:RETURN
3175 IFOP=0THENGOSUB3200:P$=B$:RETURN
3176 IFOP=1THEN3145
3178 IFOP=2THENGOSUB3400:P$=B$:RETURN
3200 REM COMPRESS OPERAND
3210 B$="":FORJ=5TO12
3220 IFMID$(S$,J,1)<>" "THENB$=B$+MID$(S$,J,1)
3230 NEXTJ:RETURN
3400 REM CONVERT TXT OPERAND
3410 B$="":FORJ=5TO12
3420 IFMID$(S$,J,1)=" "THEN3460
3430 A=ASC(MID$(S$,J,1))
3440 GOSUB2800:B$=B$+A$
3450 NEXTJ
3460 RETURN
5600 REM MOVE DATA ROUTINE
5610 PRINT"&&MOVE DATA&&"
5615 INPUT"START ADDRESS";A$:GOSUB6695:LS=A
5620 INPUT"END ADDRESS";A$:GOSUB6695:LE=A
5625 INPUT"TO ADDRESS";A$:GOSUB6695:LT=A
5630 FORI=LSTOLESTEP255
5635 MC=255
5637 IF(LE-I)=0THEN5685
5640 IF(LE-I)<255THENMC=LE-I
5645 MF=I:MT=LT+(I-LS)
5650 POKE181,MC
5660 POKE182,MF-INT(MF/256)*256:POKE183,INT(MF/256)
5670 POKE184,MT-INT(MT/256)*256:POKE185,INT(MT/256)
5680 SYS(915)
5685 NEXTI
5690 GOTO6200
6200 REM INITIALIZE IMPORTANT VARIABLES
6204 X$="0123456789ABCDEF"
6208 LL$="2223222332112"
6210 O$(0)="BRK,ORA0ERR,ERR,ERR,ORA1ASL1ERR,PHP,ORA2ASL,ERR,ERR,ORA3ASL3ERR,"
6215 O$(1)="BPL,ORA4ERR,ERR,ERR,ORA5ASL5ERR,CLC,ORA6ERR,ERR,ERR,ORA7ASL7ERR,"
6220 O$(2)="JSR,AND0ERR,ERR,BIT1AND1ROL1ERR,PLP,AND2ROL,ERR,BIT3AND3ROL3ERR,"
6225 O$(3)="BMI,AND4ERR,ERR,ERR,AND5ROL5ERR,SEC,AND6ERR,ERR,ERR,AND7ROL7ERR,"
6230 O$(4)="RTI,EOR0ERR,ERR,ERR,EOR1LSR1ERR,PHA,EOR2LSR,ERR,JMP3EOR3LSR3ERR,"
6235 O$(5)="BVC,EOR4ERR,ERR,ERR,EOR5LSR5ERR,CLI,EOR6ERR,ERR,ERR,EOR7LSR7ERR,"
6240 O$(6)="RTS,ADC0ERR,ERR,ERR,ADC1ROR1ERR,PLA,ADC2ROR,ERR,JMP3ADC3ROR3ERR,"
6245 O$(7)="BVS,ADC4ERR,ERR,ERR,ADC5ROR5ERR,SEI,ADC6ERR,ERR,ERR,ADC7ROR7ERR,"
6250 O$(8)="ERR,STA0ERR,ERR,STY1STA1STX1ERR,DEY,ERR,TXA,ERR,STY3STA3STX3ERR,"
6255 O$(9)="BCC,STA4ERR,ERR,STY5STA5STX5ERR,TYA,STA6TXS,ERR,ERR,STA7ERR,ERR,"
6260 O$(10)="LDY0LDA0LDX0ERR,LDY1LDA1LDX1ERR,TAY,LDA2TAX,ERR,LDY3LDA3LDX3ERR,"
6265 O$(11)="BCS,LDA4LDX4ERR,LDY5LDA5LDX5ERR,CLV,LDA6TSX,LDY7LDA7LDX7ERR,"
6270 O$(12)="CPY0CMP0ERR,ERR,CPY1CMP1DEC1ERR,INY,CMP2DEX,ERR,CPY3CMP3DEC3ERR,"
6275 O$(13)="BNE,CMP4ERR,ERR,ERR,CMP5DEC5ERR,CLD,CMP6ERR,ERR,ERR,CMP7DEC7ERR,"
```

```
[illegible] A$(14)="[illegible]SBC0ERR:ERR:CPX1SBC1INC1ERR:INX:SBC2NC[illegible]:E[illegible]
[illegible] A$(15)="[illegible]SBC4ERR:ERR:ERR:SBC5INC5ERR:SED:SBC6ERR:E[illegible]
[illegible] REM PRINT MAIN OPTION SCREEN
[illegible] PRINT"%%MONITOR%%"
[illegible] PRINTTAB(5),"COPYRIGHT 1979 BY COMPU/THINK"
[illegible] PRINT:PRINT:PRINT:PRINT"FREE MEMORY STARTS AT ";"$";MC
[illegible] PRINT"M MOVE DATA IN MEMORY"
[illegible] PRINT"E EXECUTE PGM IN MEMORY"
[illegible] PRINT"D DUMP MEMORY"
[illegible] PRINT"U UNASSEMBLE PGM IN MEMORY"
[illegible] PRINT"A ADD TWO NUMBERS"
[illegible] PRINT"N CONVERT NUMBER"
[illegible] PRINT"A TINY PET-ASSEMBLER"
[illegible] PRINT:PRINT"ANY OTHER KEY RETURNS HERE"
[illegible] PRINT"HEXADECIMAL NUMBERS MUST BEGIN"
[illegible] PRINT"WITH A $ SYMBOL  $A254 DECIMAL  "
[illegible] PRINT"NUMBERS USE DIGITS ONLY 542   "
[illegible] PRINT"OR THE NUMBERS BEGIN WITH AN 0 "
[illegible] GET[illegible]$:IF[illegible]$="":THEN[illegible]520
[illegible] IF[illegible]$="M":THEN[illegible]500
[illegible] IF[illegible]$="E":THEN[illegible]400
[illegible] IF[illegible]$="D":THEN[illegible]"
[illegible] IF[illegible]
[illegible] [illegible]:THEN[illegible]200
[illegible] [illegible]$="A":THEN1500
[illegible] IF[illegible]$="U":THEN[illegible]000
[illegible] IF[illegible]$="N":THEN[illegible]100
[illegible] GOTO[illegible]00
[illegible] REM EXECUTE ROUTINE IN MEMORY
[illegible] PRINT"%%EXECUTE ROUTINE%%"
[illegible] INPUT"ADDR ";A$:GOSUB6695
[illegible] PRINT
[illegible] POKE901,INT(A/256)
[illegible] POKE900,A-INT(A/256)*256
[illegible] INPUT"A ";A$:GOSUB6695
[illegible] POKE911,A
[illegible] INPUT"X ";A$:GOSUB6695
[illegible] POKE912,A
[illegible] INPUT"Y ";A$:GOSUB6695
[illegible] POKE914,A
[illegible] SYS(900)
[illegible] PRINT:PRINT"RESULTS"
[illegible] PRINT
[illegible] A=PEEK(911)
[illegible] PRINT"A ";A;TAB(15);"$";:B=A:GOSUB6655:PRINT
[illegible] A=PEEK(912)
[illegible] PRINT"X ";A;TAB(15);"$";:B=A:GOSUB6655:PRINT
[illegible] A=PEEK(914)
[illegible] PRINT"Y ";A;TAB(15);"$";:B=A:GOSUB6655:PRINT
[illegible] GOTO520
```

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```
6500 REM UNASSEMBLE MEMORY ROUTINE
6501 PRINT"&&UNASSEMBLE ROUTINE&&"
6502 PRINT
6506 INPUT"ADDR";A$:GOSUB6695
6507 S=A
6508 PRINT"";:INPUT"INSTRUCTIONS",A$
6509 GOSUB6695:N1=A
6510 PRINT"HEXADECIMAL ASSEMBLER      DECIMAL":PRINT
6512 IFN1>20THENN1=20
6515 FORI=1TON1
6518 B=INT(S/256):GOSUB6655
6520 B=S-INT(S/256)*256:GOSUB6655
6522 PRINTTAB(24);RIGHT$("     "+STR$(S),5):PRINT"";TAB(4);
6525 PRINT" ";
6530 J=PEEK(S):K=INT(J/16):L=J-K*16+1
6535 M=ASC(MID$(O$(K),L*4,1))-ASC("0")+1
6540 N=VAL(MID$(LL$,M,1)):FORP=1TON
6545 B=PEEK(S+P-1):GOSUB6655
6550 NEXTP
6551 PRINTTAB(30);:FORP=1TON
6552 B=PEEK(S+P-1)
6553 PRINTRIGHT$("00"+RIGHT$(STR$(B),LEN(STR$(B))-1),3);
6554 NEXTP
6555 PRINT:PRINT"";
6558 PRINTTAB(12);MID$(O$(K),L*4-3,3);" ";
6560 B=PEEK(S+1)
6565 ONMGOSUB6675,6655,6680,6660,6685,6690,6650,6605,6610,6615,6620,6625,6630
6570 PRINT
6597 S=S+N
6598 NEXTI
6599 GOTO6320
6600 REM MISC  ROUTINES FOR UNASSEMBLE
6605 GOSUB6660:PRINT",X":RETURN
6610 PRINT"(";:GOSUB6660:PRINT",X)";:RETURN
6615 GOSUB6655:PRINT",Y":RETURN
6620 PRINT"A";:RETURN
6625 RETURN
6630 IFB>127THENB=((NOTB)AND255)+1:B=-B
6635 T=S+2+B
6640 B=INT(T/256):GOSUB6655
6645 B=T-INT(T/256)*256:GOSUB6655:RETURN
6650 GOSUB6660:PRINT",Y":RETURN
6655 PRINTMID$(X$,INT(B/16)+1,1);MID$(X$,B-INT(B/16)*16+1,1);:RETURN
6660 B=PEEK(S+2):GOSUB6655
6665 B=PEEK(S+1):GOSUB6655
6670 RETURN
6675 PRINT"(";:GOSUB6655:PRINT",X)";:RETURN
6680 PRINT"#";:GOSUB6655:RETURN
6685 PRINT"(";:GOSUB6655:PRINT"),Y";:RETURN
6690 GOSUB6655:PRINT",X";:RETURN
```

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```
6695 IF"$"=LEFT$(A$,1) HEN6698
6696 IF"O"=LEFT$(A$,1):HEN900
6697 A=VAL(A$):GOTO6699
6698 K=1:GOSUB6900
6699 RETURN
6800 REM FIX BASIC BUG
6805 REM FIX BASIC BUG
6810 REM FIX BASIC BUG
6815 REM FIX BASIC BUG
6820 REM FIX BASIC BUG
6825 REM FIX BASIC BUG
6830 REM FIX BASIC BUG
6900 REM CONVERT HEX NUMBER TO DECIMAL
6905 A$=RIGHT$("0000"+A$,4):A=0
6910 FORJ1=KTO4
6915 C$=MID$(A$,J1,1):C=0
6920 IFC$>="A"ANDC$<="F"THENC=ASC(C$)-ASC("A")+10
6925 IFC$>="0"ANDC$<="9"THENC=ASC(C$)-ASC("0")
6930 A=A*16+C
6935 NEXTJ1
6999 RETURN
7000 REM DUMP MEMORY ROUTINE
7005 PRINT"&&MEMORY DUMP&&"
7010 PRINT:K=1
7015 INPUT"ADDR";A$:GOSUB6695:S=A
7020 PRINT";:INPUT"# OF LINES";A$
7022 GOSUB6695:N=A:IFN>20THENN=20
7025 PRINT"\ADDR\ &&&&DECIMAL&&&& &&&HEXA&&& \CHAR":PRINT
7030 FORL=1TON
7032 PRINTTAB(7);
7035 FORI=1TO5:GOSUB7095
7040 PRINTRIGHT$("000"+RIGHT$(STR$(B),LEN(STR$(B))-1),3);:NEXTI
7045 PRINTTAB(23);:K=2
7050 FORI=1TO5:GOSUB7095
7055 GOSUB6655:NEXTI
7060 PRINTTAB(34);
7062 FORI=1TO5:GOSUB7095:GOSUB7400
7065 PRINTA$;
7070 NEXTI
7072 PRINT:PRINT" ";:T=S+(L-1)*5
7075 GOSUB6640:PRINT" '"
7090 NEXTL:GOTO7099
7095 B=PEEK(S+I+(L-1)*5-1):RETURN
7099 G TO6320
7100 REM LOAD PROGRAM INTO MEMORY
7110 A$=LEFT$(P$,4)
7120 K=1:GOSUB6900:S=A
7130 FORI=5TOLEN(P$)STEP2
7140 A$=MID$(P$+"0",I,2)
7150 GOSUB6900
```

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```
7160 POKES+INT(I/2)-2,A
7170 NEXTI
7180 POKE1,S-INT(S/256)*256
7190 POKE2,INT(S/256)
7199 RETURN
7300 REM DATA FOR STORED PROGRAM
7310 L9=0
7320 RETURN
7400 REM CONVERT HEX TO PET-ASCII
7410 IFB<32THENB=32
7420 IF(B>95)AND(B<160)THENB=32
7430 IFB>223THENB=32
7440 A$=CHR$(B)
7450 RETURN
7800 REM RESOLVE RELATIVE ADDRESS
7810 A$=MID$(S$,5,5):GOSUB6695
7820 A=A-(OA+2)
7830 IFA<0THENA=256+A
7840 GOSUB2800:RETURN
7900 REM POKE MEMORY
7910 FORI=1TOLEN(P$)STEP2
7920 A$=MID$(P$+"0",I,2)
7930 GOSUB6900
7940 POKES+INT(I/2),A
7950 NEXTI:RETURN
8000 REM CONVERT AND ADD HEX NUMBERS
8005 PRINT"&&ADD NUMBERS&&"
8010 PRINT:K=1
8015 INPUT"# ONE";A$:GOSUB6695:S=A
8017 PRINT:K=1
8020 INPUT"# TWO";A$:GOSUB6695:S2=A
8030 PRINT:K=1
8040 A=S+S2
8050 GOTO8120
8100 REM CONVERT NUMBER
8105 PRINT"&&CONVERT NUMBER&"
8110 PRINT
8115 INPUT"NUMBER ";A$:GOSUB6695
8120 PRINT:PRINT"DECIMAL = ";A
8140 PRINT
8145 GOSUB950:PRINT"OCTAL = ";B
8150 PRINT:PRINT"HEXADECIMAL = ";
8155 H=INT(A/256):L=A-(H*256)
8160 B=H:GOSUB6655
8170 B=L:GOSUB6655
8180 GOTO6320
```